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PRINCIPAL INVESTIGATOR: Janice M. Brown, Ph.D.

CONTRACTING ORGANIZATION: Research Triangle Institute (RTI)
Research Triangle Park, NC 27709-2194

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14. ABSTRACT The current project was undertaken to identify the impact of deployment injury on measures of family functioning (i.e., relationship adjustment, parental stress, and family chaos) as well as on measures of psychological symptoms of the service member (i.e., PTSD, depression, and alcohol use). Returning NG service members and their spouses rated family functioning as lower in the face of psychological difficulties experienced by the service member. Physical injury was positively related to psychological distress among service members. Neither the spouses of returning NG members nor the service members themselves reported significantly reduced family functioning in the face of physical dysfunction. Likewise, neither group reported significantly reduced family functioning in the face of physical dysfunction coupled with psychological difficulties. Thus, at least at this point in the reunification process, although invisible wounds of war are a detriment to family functioning, visible wounds of war appear to be protective against family dysfunction, even when psychological problems are present.					
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1. Introduction and Objectives

Veterans returning from OIF/OEF are at greatly increased risk for developing psychological problems (Tanielian & Jaycox, 2008), and the top psychiatrist for the Army states that this is in large part due to the stress on the family (Mental Health Advisory Team (MHAT), 2008). Indeed, returning veterans are two to three times as likely to divorce and more likely to be involved in domestic violence toward partners and children than non-deploying military members (Marshall, Panuzio & Taft, 2005). It is suspected that *wounded warriors* are at even greater risk for family dissolution (Manguno-Mire et al., 2007; Norris, Byrne, Diaz, & Kaniasty, 2007). However there is currently no systematic attempt to understand the distress of families of wounded combat veterans or to assist them in coping with their difficulties. The first objective was to identify the impact of deployment injury on three measures of family functioning (i.e., relationship adjustment, parental stress, and family chaos) as well as on three measures of psychological symptoms of the service member (i.e., PTSD, depression, and alcohol use). In order to examine both partner effects and actor effects, variables of family functioning were examined independently for service members and their spouse/significant other. A deployment injury was hypothesized to predict lower general family functioning. The relation of physical and psychological injuries was predicted to exacerbate each factor. The presence of polytrauma (psychological plus physical injury) was expected to lead to worse family functioning than either alone.

A second objective was to identify the predictive power of family functioning on post-deployment service members' psychological symptoms in the realms of PTSD, depression, and alcohol use in an active duty military population. While some researchers assert that psychopathological effects of combat place veterans at risk for family functioning difficulties (Taft et al., 2008), others have found that family stability may function as a protective factor against the development of psychopathology (Israel et al., 2010; Israel & Roderick, 2001; Israel, Roderick, & Ivanova, 2002; Ivanova & Israel, 2005; Sokolowski & Israel, 2008). This distinction is shown in recent military research. We know that once a veteran is diagnosed with PTSD, supportive family relationships may facilitate treatment seeking and treatment retention, but the question remains as to whether family support can protect against the development of symptoms (Meis, Barry, Kehle, Erbes, & Polusny, 2010). Likewise, there is some initial support for the protective nature of romantic relationships given that veterans with PTSD showed higher insecure romantic attachment compared to veterans without PTSD (Ghafoori,

Wierholzer, Howsepian, & Boardman, 2008). Unfortunately, the theoretical and empirical literature examining the protective features of military families is scarce, and that which is available is limited to observations within the context of PTSD, so our understanding of the protective nature of supportive relationships and its relation to other mental health problems such as depression and alcohol use is limited.

Thus, a key question to be examined was whether family support could mitigate the development of psychopathology following combat exposure during deployment. For this study, we conceptualized individual resilience within the relational context of family functioning and supportive relationships.

2. Body

- A secondary analysis of data collected by Michigan State University and the University of Michigan was conducted. Participants were recruited from National Guard members and their spouses/significant others attending mandatory (for service members) reintegration weekends between October 2007 and September 2009 at conference centers in the Midwest.
- A secondary analysis of data from the 2008 Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel was conducted. Participants were active duty military personnel.

3. Key Research Accomplishments

- Draft publication under development for NG data
- Draft publication under development for additional companion analyses on Active Duty data
- Two presentations of data from the project

4. Reportable Outcomes

Presentations (See Appendix A)

- Military Family Research IPR, July 2011
- Military Family Research Institute, September 2011

Publications (See Appendix B)

- Two manuscripts for submission are being prepared.
 - ✓ Family Functioning After Deployment among National Guard Members
 - ✓ Family Support as a Protective Factor Against Psychological Problems in the Military

5. Conclusions

Preliminary analysis of National Guard data indicates that:

- Psychological Wounds of War:
 - o Spouses of returning NG members and the service members both rate family functioning lower in the face of psychological difficulties experienced by the service member.
- Physical Wounds of War:
 - o Physical injury is related to psychological distress among service members
 - o Neither the spouses of returning NG members nor the service members themselves reported significantly reduced family functioning in the face of physical dysfunction.
- Polytrauma Wounds of War:
 - o Polytrauma had no effect on any family functioning measure for either service members or spouses.
 - o Suspected mTBI had an effect on relationship stress for both service members and spouses, and parenting stress for service members only.

Thus, it appears that, at least at this point in the reunification process, although invisible wounds of war are a detriment to family functioning, visible wounds of war appears to be protective against family dysfunction, even when invisible wounds are present.

Preliminary analysis of Active Duty data indicates that:

- Psychological
 - o Multiple family features had a protective association against depression.
 - o Lower family-work conflict and work-family conflict were both associated with a lower likelihood of depression.
 - o Service members who had fewer family problems were also less likely to experience depression.
 - o Any perceived change in relationship quality, both positive and negative, was associated with increased risk of depression.

- Fewer conflicts between work and family and family and work were related to lower rates of PTSD. The likelihood of PTSD decreased with fewer family problems and relationship stability.
- Physical
 - Illness or injury in general and deployment-related injuries were related to increased risk of PTSD.
- Alcohol Use
 - Harmful drinking was not related to general injury/illness or deployment-related injury. Low to moderate combat exposure was associated with less likelihood of harmful alcohol use.
 - Harmful drinking was less likely with better family functioning.
 - Change in relationship quality was unrelated to harmful drinking but relationships that continued postdeployment had a protective association.

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Appendix A

Draft Manuscripts

Introduction

Veterans returning from OIF/OEF are at greatly increased risk for developing psychological problems (Tanielian & Jaycox, 2008), and the top psychiatrist for the Army states that this is in large part due to the stress on the family (Mental Health Advisory Team (MHAT), 2008). Indeed, returning veterans are two to three times as likely to divorce and more likely to be involved in domestic violence toward partners and children than non-deploying military members (Marshall, Panuzio & Taft, 2005). It is suspected that *wounded warriors* are at even greater risk for family dissolution (Manguno-Mire et al., 2007; Norris, Byrne, Diaz, & Kaniasty, 2007). However there is currently no systematic attempt to understand the distress of families of wounded combat veterans or to assist them in coping with their difficulties. The current study aimed to identify the impact of deployment injury on three measures of family functioning (i.e., relationship adjustment, parental stress, and family chaos) as well as on three measures of psychological symptoms of the service member (i.e., PTSD, depression, and alcohol use). In order to examine both partner effects and actor effects, variables of family functioning were examined independently for service members and their spouse/significant other. A deployment injury was hypothesized to predict lower general family functioning. The relation of physical and psychological injuries was predicted to exacerbate each factor. The presence of polytrauma (psychological plus physical injury) was expected to lead to worse family functioning than either alone.

Methods

We conducted a secondary analysis of data collected by Michigan State University and the University of Michigan. Participants were recruited from National Guard members and their spouses/significant others attending mandatory (for service members) reintegration weekends between October 2007 and September 2009 at conference centers in the Midwest. The two-day reintegration programs took place approximately 45-90 days following the service member's return home from a 12-month deployment in either Operation Iraqi Freedom (OIF) or Operation Enduring Freedom (OEF). Data collection incorporated two distinct phases. In the first phase participants were paid a \$10 gift card for participation and the response rate was 40% for service members and 36% for spouses/significant others. The number of participants in this phase totaled 327 service members and 217 spouses/significant others with outcome measures of dyadic adjustment and parenting stress.

In the second phase participants were paid a higher incentive of \$25 and the response rate was 78% for service members and 80% for spouses/significant others. The number of participants in this phase totaled 579 service members and 321 spouses/significant others assessed for dyadic adjustment, parenting stress, and a third outcome variable, family chaos. The study was announced to potential participants during a large meeting during the reintegration weekend and volunteer participants filled out the anonymous/confidential survey which took approximately 30-40 minutes to complete. The study was approved by the Institutional Review Boards at Michigan State University and the University of Michigan.

Participants

A total of 906 National Guard members and 538 spouses/significant others were included in the final data set ($n = 1444$). This group includes 525 linked couples and 364 two parent households. The data set contained the following Military Occupational Specialties: infantry, cavalry, transportation, service personnel, medical, military police, and security forces with the largest representation from infantry. The service member sample was largely male (89%) while the spouse sample was overwhelmingly female (96%). Caucasians made up 83% of the sample followed by African Americans (7%), Hispanics (3.5%), Native Americans (1.5%), Asian Americans (2%), and Multi-ethnic (1%). In comparison to National Guard demographics (DOD, 2006) at the national level, our sample included higher percentages of males (89% versus 83% nationally), married (55.5% versus 51% nationally), and families with children (60% versus 43% nationally).

Measures

Marital Adjustment. Dyadic adjustment was measured with the Revised Dyadic Adjustment Scale (Busby, Christensen, Crane, & Larson, 1995). The RDAS is a 14-item Likert-type scale and has multiple response choices. The total RDAS Cronbach's alpha for this study was 0.88 for both service members and spouses. A criterion cutoff score to distinguish between distressed and non-distressed couples was established for the RDAS (Crane, Middleton, & Bean, 2000), with a score of 47 and below representing distressed, and a score of 48 and above representing non-distressed couples.

Parental Stress. Parental stress was measured using the Parental Stress Scale (Berry & Jones, 1995). The measure contains 18 Likert items with lower total scores reflecting less stress associated with parenting. The test-retest reliability for the scale is $r = .81$ and the internal consistency is $\alpha = .83$.

Family Chaos. The Confusion, Hubbub, and Order Scale (CHAOS; Matheny, Wachs, Ludwig, & Phillips, 1995) is a 15-item, forced-choice questionnaire assessing characteristics of noise, confusion, clutter, frantic activities, and disorganization in the household. Seven items focus on household routines and organization, for example, "Your family can usually find things when they need them") and eight on disorganization, confusion, and noise, for example, "You can't hear yourself think at home" Dumas and colleagues (Dumas, Nissley, Nordstrom, Smith, Prinz, & Laughlin, 2005) found the CHAOS scale to have high internal consistency, with Cronbach's alphas of .81 and .83, and 12-month test-retest stability of .74. In our analyses, a lower score on the measure represents characteristics of a more chaotic, disorganized, and hurried home.

Post-Traumatic Stress Disorder (PTSD). PTSD for the service member was measured by the Posttraumatic Stress Disorder Checklist (PCL) (Weathers, Litz, Herman, Huska, & Keane, 1991) a 17-item self report measure of DSM-IV symptoms of PTSD. The total PCL Cronbach's alpha for this study was 0.94 for service members. Using the reference point of 30 days, respondents were asked to answer each item related to their most distressing military event using a 5-point Likert type. A stringent cut-off score of 50 was used for likely PTSD.

For wave 1, PTSD for the spouse was assessed using the Stressful Life Event Screener to identify and reference traumatic life events of spouses in relation to non-military events. This screening measure was adapted from Goodman et al.'s Stressful Life Events Screening Questionnaire (Goodman, Corcoran, Turner, Yuan, & Green, 1998). Presented with a list of 15 stressful life events, respondents indicated whether they had experienced any of the events as well as which one event was most distressing. In reference to their most distressing life event, spouses completed the Short Screening Scale for DSM-IV PTSD (Breslau, Peterson, Kessler, & Schultz 1999). The instrument was selected because it is a brief 7-item self-report measure of PTSD symptomatology. The Cronbach's alpha for the Short Screening Scale in this study was 0.82. Spouses were identified as meeting the criteria for likely PTSD if they met the cutoff score of four or higher (Breslau et al., 1999). For the second wave of data collection, spouses' reported their level of stress on the 17-item PCL-C (Weathers et al., 1993) rather than the PTSD Short Screening Scale (Breslau et al., 1999). The Stressful Life Events Screening Questionnaire (Goodman et al., 1998) was eliminated in the second wave of the study to

reduce burden to participants. Subsequently, the PCL-C was given without referencing their most distressing life event. Similar to the service member assessment, a stringent cut-off score of 50 was used on the civilian versions of the PCL.

Depression. Depression was measured using the Beck Depression Inventory Second Edition BDI-II (Beck, Steer, & Brown, 1996) for the first wave and the Patient Health Questionnaire PHQ-9 (Kroenke, Spitzer, & Williams, 2001) for the second wave of data collection. The BDI-II is a 21-item self-report inventory is effective in discriminating among individuals with various levels of depression ranging from minimal to severe. The measure had a high internal consistency with a Cronbach's alpha of 0.91. We used a total score of 14 or greater on the BDI-II as meeting the criteria for likely depression. The PHQ-9 is a self-report instrument that assesses 9 DSM-IV symptoms of depression over a 2-week period, with total scores ranging from 0 to 27 (Kroenke, Spitzer, & Williams, 2001). Cut off scores of 10 or higher indicate depressive symptoms. The PHQ-9 has acceptable reliability with a Cronbach's alpha of 0.84 for this study.

Alcohol Use. Alcohol use was assessed with the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, Fuente, & Grant, 1993). This 10-item instrument is scored on a 5-point Likert scale, with total scores ranging between 0-40. An AUDIT score of 8 or higher indicates alcohol misuse. The instrument has good internal consistency, with a Cronbach's alpha of .80.

Injury. Physical injury was self reported by the service member. Participants responded to a series of questions about their most recent deployment as well as a series of questions about a previous deployment experience. If the service member responded yes to "Were you wounded or injured?" during the most recent deployment or during a previous deployment they were classified as having a deployment related injury.

Results

Paired-sample *t* test were conducted to compare the means of service members' and spouses' scores on family functioning variables. A significant difference was found between service members' and spouses' self-report of family chaos ($t(197) = -2.50, p < .05$). No significant difference was found between service members' and spouses' report of dyadic adjustment ($t(503) = .752, ns$) or parental stress ($t(342) = .805, ns$). The family chaos measure was added in our data collection after 2009, the parental stress was only collected from parents, and dyadic adjustment was collected from all couples reflecting varying degrees of freedom in the output.

Thirty-nine percent of service members and 40% of spouses reported clinically distressed relationships. Scores on family function variables were highly correlated. A weak correlation that was not significant was found ($r(359) = -.009, p = .863$). Service members' parental stress was not related to spouses' dyadic adjustment in the sample.

A primary aim of the study was to understand how an injury effects family functioning. For this sample, 11% reported that they had been wounded or injured in their most recent deployment and 13% reported that they had been injured in a previous deployment. When an additional variable was created to combine these two questions, 15% reported that they had been wounded or injured in a deployment. Since we were also interested in the psychological effects of deployment on family functioning, we created a dichotomous variable for psychological injury if the individual met the strict screening criteria for one or more behavioral health issues which included depression, PTSD, or hazardous alcohol use. Service members (43%) and spouses (33%) indicated clinical ranges of psychological functioning 45-90 days post-deployment.

Testing the effects of Injury on Service Members' and Spouses' Outcomes

Regression Analysis was conducted on whether physical injury predicted lower family functioning. Psychological injuries (depression, substance abuse, and PTSD) was predictive of lowered dyadic adjustment (DAS), parental stress (PSS), and family chaos (CHAOS). Physical Injury was not found to be predictive on these measures of family functioning. However, head injury was found to be related to dyadic adjustment and parental stress measures ($p < .002$). In a multiple regression with PTSD entered into the model, head injury no longer predictive, suggesting that the head injury was either associated with PTSD rather than a physical wound, or that PTSD is so closely related to head injury that it was not possible to tease out these components in this limited sample size of head injured patients.

Multilevel modeling was used to test whether deployment injury predicted lower family functioning or higher levels of psychological distress for service members and their spouses. This data analytic approach allows for non independence between service members' and their spouses' scores, and unlike mixed-model ANOVA, it does not exclude cases in which one partner has missing data. In these analyses we tested whether there were mean differences as a function of injury status, role (i.e., service member versus spouse), and the

interaction between injury status and role. There were no significant differences for service members or spouse in dyadic adjustment as a function of injury.

The analysis examining parental stress was restricted to families with children, and included a total of 364 couples. The role main effect suggests that parental stress was higher for service members ($M = 36.40$, $SD = 9.42$) than for spouses ($M = 35.80$, $SD = 9.90$). However, this effect was qualified by a significant interaction with injury status such that there was no role difference in parental stress for couples in the no injury group, $F(1,284) = .01$, $p = .94$, but there was a significant role difference for deployment injury couples, $F(1,51) = 4.68$, $p = .035$. Service members who reported a deployment injury had significantly higher parental stress than their spouses.

Alcohol use also showed a significant role main effect such that on average service members reported higher levels of hazardous alcohol use ($M = 5.78$, $SD = 5.87$), than their spouses ($M = 3.50$, $SD = 4.06$). The interaction between injury status and role was also statistically significant. Examination of the means suggests that injury status did not affect spouses' alcohol use, $F(1,489) = .25$, $p = .62$ but it did affect service members hazardous alcohol use, $F(1, 492) = 4.08$, $p = .04$. Injured service members reported higher alcohol use than non-injured service members.

Three variables were used to run analysis to test the effects of deployment injury on depression. The BDI scores for sample 1, the PHQ scores for sample 2, and the z score for the BDI and PHQ of the full data set. In all three analyses there was a significant main effect for injury. The injury main effect suggests that depressive symptoms were higher for individuals within a family where the service member reported a deployment related injury (BDI $M= 11.48$, $SD= 8.82$; PHQ $M= 7.74$, $SD= 5.83$) than for individuals in families where there was no deployment injury reported (BDI $M= 8.33$, $SD= 7.94$; PHQ $M= 5.56$, $SD= 4.94$). The role main effect in sample 1 suggests that the overall depression scores was higher for spouses ($M = 8.91$, $SD = 8.76$) than for service members ($M = 8.52$, $SD = 7.41$). This effect was qualified by a significant interaction with injury status such that there was not a statistically significant role difference in BDI scores for couples in the no injury group, $F(1,168) = 3.60$, $p = .06$, but there was a significant role difference for deployment injury couples, $F(1,26) = 5.73$, $p = .024$. Service members in sample 1 who reported a deployment injury had significantly higher depression scores than their spouses. However, for sample 2, examination of the means

suggests that injury status affected both the spouses' depressive scores, $F(1, 294) = 5.93$, $p = .015$) and the service members depression scores, $F(1,297) = 8.48$, $p = .004$. In the non-injured couples, the spouses had higher levels of depression than the service members. However, within the couples where a service member had reported a deployment injury, the reverse was true, the service members had higher depression scores than the spouses.

The PCL-M was completed by all service members in the study to assess their level of PTSD symptoms, and in the second sample, spouses also received the PCL-C to assess PTSD symptoms. Overall, there was a significant injury effect on PTSD for service members $F(1,478) = 51.33$, $p = .000$. Service members who reported a deployment injury had higher levels of PTSD ($M = 41.25$, $SD = 16.98$) than non-injured service members ($M = 29.02$, $SD = 12.61$). In sample 1, univariate analysis showed a significant main effect for injury on PTSD symptoms for the service members. In addition to the significant main effect for injury, in sample 2 there were also main effects for role. However, this effect was qualified by a significant interaction with injury status such that there was no role difference in PTSD for couples in the no injury group, $F(1,326) = 1.56$, $p = .213$, but there was a significant role difference for deployment injury couples $F(1,18) = 6.26$, $p = .022$. If there was no injury, PTSD scores were low for both service member and the spouse. When there was a deployment injury, PTSD scores were significantly higher for the service member than the spouse.

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Family Support as a Protective Factor against Psychological Problems in the Military

Janice M. Brown, Jason Williams, Robert M. Bray, Marian E. Lane, Erin Anderson

RTI International

The wars in Iraq and Afghanistan are producing a new generation of veterans who are at risk of developing serious mental health problems, including substance use and chronic stress disorders, as well as experiencing marital and family problems. A number of studies have shown that the past-year rates of psychiatric and substance use disorders among military personnel returning from deployment are higher than in the non-deployed population (Hoge et al., 2004; Hoge, Terhakopian, Castro, Messer, & Engel, 2007; Seal, Bertenthal, Miner, Sen, & Marmar, 2007). As can be expected, the associations among combat experiences, psychological functioning, and family dynamics are complex and interrelated. Combat duty during deployment is associated with increased utilization of mental health services, increased attrition from the military, disruptions in family functioning, and marital difficulties (Cook, Riggs, Thompson, Coyne, & Sheikh, 2004; Gimbel & Booth, 1994; Hoge, Auchterlonie, & Milliken, 2006; Milliken, Auchterlonie, & Hoge, 2007; Orcutt, King, & King, 2003; Sayers, Farrow, Ross, & Oslin, 2009; Seal et al., 2008; Taft, Schumm, Panuzio, & Proctor, 2008).

It has been estimated that up to 19% of Operation Enduring Freedom (OEF) and Operation Iraqi Freedom (OIF) combat veterans develop PTSD symptoms within a year of returning home (Tanielian & Jaycox, 2008). Numerous studies involving combat veterans have demonstrated the relation between post-traumatic stress disorder (PTSD) and problematic family functioning (Carroll, Rueger, Foy, & Donahoe, 1985; Evans, McHugh, Hopwood, & Watt, 2003; Kulka et al., 1990; Orcutt et al., 2003). The negative effects of PTSD also extend to the marital relationship as spouses of combat veterans can experience psychological distress and care-giving burden (Manguno-Mire et al, 2007; Norris, Byrne, Diaz, & Kaniasty, 2007). In addition, communication difficulties, the inability to maintain intimacy, parenting problems, domestic violence, and divorce are some of the documented sequelae for returning veterans with PTSD (Cook et al., 2004; Gimbel & Booth, 1994; Orcutt et al., 2003; Riggs & Riggs, 2011; Sayers et al., 2009; Taft, Schumm, Panuzio, & Proctor, 2008).

Gimbel and Booth (1994) found that PTSD symptoms and antisocial behavior fully accounted for the effects of combat on marital adversity (indexed by divorce, separation, infidelity, and intimate partner violence) among a large, representative sample of Vietnam veterans. Findings were such that PTSD symptoms led to higher psychopathology, and the psychopathology variables led to more marital adversity. Kulka et al., (1990)

and Orcutt, King, and King (2003) similarly found that PTSD symptoms mediated the effects of combat exposure on intimate partner physical aggression.

There has been a shift in the fields of psychology and mental health from a focus on treating pathology after it arises to developing and reinforcing positive skills and resources that contribute to resilience before serious problems develop (Peterson & Seligman, 2004). Although there are multiple definitions of resilience, this research is guided by the idea that resilience is the ability to persist in the face of challenges and to bounce back from adversity—concepts inherent in military service. According to Walsh (2003), resilience involves “the interplay of multiple risk and protective processes over time, including individual, family, and larger sociocultural influences” (p. 400). Recent reviews suggest that the most robust protective factors for resilient adaptation to various adversities are sensitive and responsive parenting among children, and supportive family or other social networks among adults (Charuvastra & Cloitre, 2008).

While some researchers assert that psychopathological effects of combat place veterans at risk for family functioning difficulties (Taft et al., 2008), others have found that family stability may function as a protective factor against the development of psychopathology (Israel et al., 2010; Israel & Roderick, 2001; Israel, Roderick, & Ivanova, 2002; Ivanova & Israel, 2005; Sokolowski & Israel, 2008). This distinction is shown in recent military research. We know that once a veteran is diagnosed with PTSD, supportive family relationships may facilitate treatment seeking and treatment retention, but the question remains as to whether family support can protect against the development of symptoms (Meis, Barry, Kehle, Erbes, & Polusny, 2010). Likewise, there is some initial support for the protective nature of romantic relationships given that veterans with PTSD showed higher insecure romantic attachment compared to veterans without PTSD (Ghafoori, Wierholzer, Howsepian, & Boardman, 2008). Unfortunately, the theoretical and empirical literature examining the protective features of military families is scarce, and that which is available is limited to observations within the context of PTSD, so our understanding of the protective nature of supportive relationships and its relation to other mental health problems such as depression and alcohol use is limited.

Thus, a key question to be examined is whether family support can mitigate the development of psychopathology following combat exposure during deployment. For this study, we conceptualized individual resilience within the relational context of family functioning and supportive relationships. We aimed to identify

the predictive power of family functioning on post-deployment service members' psychological symptoms in the realms of PTSD, depression, and alcohol use.

Methods

Participants

Data were drawn from the 2008 Department of Defense (DoD) Survey of Health Related Behaviors Among Active Duty Military Personnel (2008 HRB Survey). The survey consists of a randomly selected representative sample of active duty military personnel from the Army, Navy, Marine Corps, Air Force, and Coast Guard. The final sample of participants consisted of 28,546 military personnel who completed questionnaires, the response rate was 70.6%; data were weighted to represent all active duty personnel and adjust for nonresponse.

Because the current study focuses on family functioning, our sample includes a subset of the larger 2008 HRB Survey sample and comprises only those participants in the DoD Services who reported being "married" or "living as married" on the survey. This consisted of 15,080 participants from the Army, Navy, Marine Corps, and Air Force only.

Survey Procedures

The majority (97%) of the 32-page anonymous self-report questionnaires were obtained during on-site visits to 64 military installations worldwide by the study team. The rest were obtained from questionnaires mailed to respondents who were unable to attend group sessions. At the group sessions, survey data collection field teams described the purpose of the study, assured participants of anonymity, informed participants of the voluntary nature of the survey, distributed introductory handouts, ensured that an ombudsperson was present for each group administration to attest that teams explained the voluntary nature of participation, and showed personnel the correct procedures for marking the questionnaire. Team members then distributed optical-mark questionnaires to participants, who completed and returned them. On average, the questionnaire required about an hour to complete. Institutional Review Board approval was obtained from RTI International and DoD. Additional sampling and methodological details have been reported and published elsewhere (Bray et al, 2010).

Key measures

Depression. Depression was assessed using the 10-item short version of the Center for Epidemiologic Studies Depression Scale (CESD-10). Cutoff scores for depressive symptoms were ≥ 10 (Radloff, 1977). Andresen et al

(1994) found good predictive accuracy when they compared the CESD-10 to the full-length 20-item version of the CES-D.

PTSD. PTSD symptom severity was assessed using the PTSD Checklist, Civilian Version (PCL-C), a 17-item self-report instrument that asks respondents to rate the extent to which they have been bothered by PTSD symptoms during the previous 30 days using a five-point scale ranging from “*not at all*” to “*extremely*” (Weathers, Litz, Huska, & Keane, 1994). PCL-C items parallel DSM-IV PTSD symptom criteria B, C, and D, and a variety of studies support the use of the PCL-C as a valid and reliable screening instrument (e.g., Keen et al., 2008; Ruggiero et al., 2003). The HRB Survey, and other DoD studies, prefer the PCL-C over the military version of the PCL because the military version ignores symptoms from non-military experiences and can miss common causes of deployment or war-related PTSD in women (e.g., sexual assault rather than combat) as well as deployment-related exacerbations of PTSD symptoms if the original inciting trauma is not military related. The standard cutoff was used such that if the sum was greater than or equal to 50, the participant was classified as positive for PTSD; those with scores less than 50 were considered not to have PTSD (Lang & Stein, 2004). For these analyses, three subscales were analyzed to determine their specific risk potential on family functioning: re-experiencing, avoidance behaviors, and hyperarousal.

Harmful Alcohol Use. Harmful drinking was assessed with the Alcohol Use Disorders Identification Test (AUDIT), which was developed by the World Health Organization (WHO) as a simple method of screening for excessive drinking and of assisting in brief assessment. The AUDIT consists of 10 questions scored 0 to 4 that are summed to yield a total score ranging from 0 to 40. Scores of 16 or greater were used as the cutoff to indicate harmful drinking behavior.

Combat Exposure: Exposure to combat and related circumstances was measured using a 17-item scale. These items assess exposure to incoming fire, mines, improvised explosive devices (IEDs), as well as commonly experienced combat situations such as firing on the enemy, viewing dead bodies or human remains, and interacting with enemy prisoners of war. Each item asked how many times the respondent was exposed, with 5 categorical response options ranging from 0 = “0 times” to 4 = “51 or more times.” All items were summed and the sum score was used to create a categorical combat exposure item where a score equal to zero was considered “Low Exposure,” a score from 1 to 9 was classified as “Moderate Combat Exposure,” and a

score of 10 or greater was considered as “High Combat Exposure.” A fourth category was added to capture personnel who had not been deployed. The cutoff scores used to determine these categories were subsequently examined with factor analysis and item scoring methods that suggest these categories captured meaningful distinctions between groups of scores.

Family Functioning. Family functioning was assessed in three ways, based on level of family conflict, family problems, and relationship changes since last deployment. Family conflict was measured with two scales, Work-Family Conflict (WFC) and Family-Work Conflict (FWC). WFC and FWC are both assessed via five-item scales based on the work of Netemeyer, Boles and McMurrian (1996). Items ask about the degree to which respondents’ military work for job affects their home or family/personal life (WFC), and vice versa (FWC). The scores for each scale range from 0 to 15, with high scores indicating a high level of perceived conflict between work and family and low score indicating a low level of perceived conflict between work and family. Family problems were determined by a series of 6 items about the frequency with which respondents experienced certain situations with members of their family, including physical violence toward spouse or children, threatening to leave or leaving spouse, spouse threatening to leave or leaving, neglecting family responsibilities, and getting into heated arguments. Each item asked how many times the respondent experienced the situation, with 4 categorical response options ranging from 0=“0 times” to 3= “3 or more times.” All items were summed and averaged to create a family problems indicator, with high scores indicating a high level of family problems and low score indicating a low level of family problems.

Relationship changes were assessed by two indicators: one of changes in relationship quality, and the other of divorce or separation. For the former, respondents were asked how their relationship with their spouse or significant other has changed since their last deployment, with categorical response options of, “we argue more/have more conflict,” “we get along about the same,” and “we argue less/have less conflict.” For the latter, respondents were asked whether or not they have divorced their spouse or separated from their significant other since their last deployment; a binary indicator was created for “divorce or separation” vs. “no change.”

Deployment-related Injury. Deployment-related injury was assessed by a multiple-part item based on items from the Post-Deployment Health Assessment/Post-Deployment Health Reassessment and additional item from the combat exposure scale. These items queried participants on types of exposure during their last deployment,

such as being wounded, being involved in a blast or vehicular accident, having a fragment or bullet wound above the shoulders, or having a fall. These measures were collapsed such that participants reporting one or more exposures were categorized as having a deployment-related injury.

Past Year Illness and Injury. Respondents were asked about any illness, injury, pain, or health problems experienced in the year prior to taking the survey. The six items comprising this indicator included having an illness or injury that kept them from duty for a week or longer, being injured during or because of physical training or any other activity, having health problems, and having emergency medical help. Each item asked how many times the respondent experienced the situation, with 4 categorical response options ranging from 0=“0 times” to 3=“3 or more times.” These measures were collapsed such that participants reporting one or more problems were categorized as having a past year illness or injury.

Demographics. Demographics included gender, race/ethnicity, highest level of education, age group, and military pay grade.

Statistical analyses

Analyses were conducted with SUDAAN (Research Triangle Institute, 2008) to account for the complex sampling design of the HRB survey. The basic prevalence of depression, PTSD, and harmful alcohol use and the relationship of these outcomes to family and deployment-related factors were examined using frequencies and multiple predictor logistic regression models. These logistic regression models with only main effects tested the overall relationships in the active duty component of married or living as married personnel. A second set of logistic regression models examined the potential moderating or buffering impact of positive family function on depression and the other outcomes. Interaction terms were added to the models to test if the negative impact of combat exposure and deployment-related factors was attenuated for those with a more positive family-related environment. Significant interaction parameters indicated that the effect a combat or deployment-related stressor on mental health was not consistent across family functioning. For example, the increase in the likelihood of depression for those exposed to high combat stress relative to those with no exposure might attenuate as conflict between work and family decreases. All regression models included gender, age, race/ethnicity, paygrade, education, service, and whether not one or more children resided in the home as control measures.

Results

Sociodemographic characteristics of this subpopulation along with the overall military population are displayed in Table 1.

Insert Table 1 about here

Table 2 presents distributions of the nondemographic measures that were included in the analyses to provide a basic understanding of the prevalence of these characteristics. These distributions are for married and living as married military personnel.

Insert Table 2 about here

Table 3 presents odds ratios and 95% confidence intervals for main effect-only models of depression, PTSD, and harmful drinking. As shown, depression was more likely for those with a significant illness or injury in the past year ($OR=1.69$, CI: 1.46-1.95) and for those who had experienced a deployment-related injury ($OR=1.28$, CI: 1.02-1.59). Multiple family features had a protective association against depression. Lower family-work conflict and work-family conflict were both associated with a lower likelihood of depression ($OR=0.72$, CI: 0.65-0.80; $OR=0.43$, CI: 0.39-0.47, respectively). Servicemembers who had fewer family problems were also less likely to experience depression ($OR=0.37$, CI: 0.32-0.42). Similarly, being in a relationship that endured after returning from deployment was also protective ($OR=0.78$, CI: 0.66-0.93). In contrast, any perceived change in relationship quality, both positive and negative, was associated with increased risk of depression ($OR=2.01$, CI: 1.76-2.29; $OR=1.29$, CI: 1.04-1.60, respectively).

Similar to depression, illness or injury in general ($OR=1.72$, CI: 1.36-2.17) and deployment-related injuries ($OR=1.74$, CI: 1.40-2.16) were related to increased risk of PTSD. Unlike depression, PTSD was also associated with combat exposure, with both the nondeployed and high exposure groups experiencing elevated rates of PTSD (nondeployed $OR=1.47$, CI: 1.07-2.03; high exposure $OR=1.69$, CI: 1.30-2.18). Family and relationships had comparable relationships to PTSD as with depression. Fewer conflicts between work and family and family and work were related to lower rates of PTSD ($OR=0.41$, CI: 0.36-0.46; $OR=0.81$, CI: 0.73-0.89, respectively). Similarly, the likelihood of PTSD decreased with fewer family problems ($OR=0.53$, CI: 0.44-0.63) and relationship stability ($OR=0.70$, CI: 0.55-0.91). As with depression, any change in relationship

quality was associated with increased PTSD (positive change OR=2.63, CI: 2.12-3.26; negative change OR=1.54, CI: 1.12-2.12).

In contrast to the other primary outcomes, harmful drinking was not related to general injury/illness or deployment-related injury. Unexpectedly, low to moderate combat exposure was associated with less likelihood of harmful alcohol use (OR=0.74, CI: 0.56-0.99). Consistent with depression and PTSD, harmful drinking was less likely with better family functioning (work-family conflict: OR=0.75, CI: 0.63-0.88; family-work conflict: OR=0.78, CI: 0.67-0.93; family problems: OR=0.46, CI: 0.36-0.58). Change in relationship quality was unrelated to harmful drinking but relationships that continued postdeployment had a protective association (OR=0.49, CI: 0.35-0.68).

Insert table 3 about here

Interactions

Depression. Two interactions, both involving family problems, were significant for the depression outcome. The interaction of family problems indicated that the significant overall protective effect of lower family problems was somewhat attenuated for those personnel who had experienced an injury or illness in the past year (interaction $\beta=.347(.167)$, $p<.05$). In contrast, lower family problems in those who had been deployed and experienced low to moderate combat-related events were associated with greater decrease in the likelihood of depression relative to those with the same exposure and more family problems (interaction $\beta=-.569(.214)$, $p<.05$). A similar pattern of enhanced protective associated was found for lower family problems and high combat exposure, though the interaction failed to reach conventional significance (interaction $\beta=.394(.209)$, $p<.10$).

PTSD. The increased likelihood of PTSD associated with high combat exposure was tempered with decreased work-family conflict (interaction $\beta=-.361(.177)$, $p<.05$). A similar pattern held for combat-related injury, though only at marginal statistical significance (interaction $\beta=-.402(.209)$, $p<.10$). In both cases, less conflict between work and family demands was associated with less increased risk due to deployment related injury or high combat exposure.

Similar to results with depression, general injury or illness in the past year somewhat attenuated the positive impact of low family problems (interaction $\beta=.371(.167)$, $p<.05$).

Harmful drinking. The likelihood of harmful drinking associated with low to moderate combat exposure was accentuated in those personnel that reported that their relationships ended postdeployment (interaction $\beta=.820(.402)$, $p<.05$). This trend was also observed for those with high combat exposure but not at conventional significance (interaction $\beta=.923(.517)$, $p<.10$). Change in relationship quality postdeployment was associated with a decrease in the risk of harmful drinking attributable to past year injury or illness (negative relationship change: interaction $\beta=-1.113 (.429)$, $p<.05$; positive change: interaction $\beta=-.881 (.320)$, $p<.01$). Figure 1 shows the conditional marginals for this interaction effect.

Insert Figure 1 about here

Discussion

The current study examined the relationship and contribution of family support and family functioning on depression, PTSD, and harmful drinking behavior of active duty military personnel. The results showed a clear pattern that better family functioning was protective for all three of these outcome measures. . Reduced levels of work-family conflict, family-work conflict, and family problems (including physical and verbal altercations) were associated with lower likelihood of depression, PTSD, and harmful drinking among serivemembers who were married or living as married. Similarly, being in a relationship that endured after return from deployment was also protective against depression, PTSD and harmful drinking. Families with children in the home experienced greater protective effects against depression and alcohol misuse than those without children. These findings are encouraging in showing the importance of positive familial relationships in maintaining good mental health and avoiding alcohol problems.

The exact mechanisms underlying the findings are not clear, but two possibilities may be operating. Positive familial relationships may bolster protective mechanisms against the development or persistence of poor mental health and substance abuse. Alternatively, lower levels of family conflict and other problems may keep more physical and mental resources free to manage and mitigate other types of conflict and stress, such that negative mental health and substance use outcomes are kept at bay. Regardless of the mechanism, these findings are notable in showing the importance of strong family relationships for the success of servicemembers who undergo the stresses of war and combat. Returning veterans may need to feel support in order to ward off symptoms.

Experiencing a significant illness or injury in the past year and having experienced past deployment-related injury were also positively related to depression and PTSD, but not to harmful drinking. This finding is not surprising in that trauma associated with deployment injury or other injury may trigger symptoms of depression and PTSD. More importantly, it illustrates the toll that physical injury can take on mental health, and points out the need for health care providers to be alert to possible mental health issues when dealing with servicemembers' injuries. In addition, it highlights the importance of having strong support systems for military personnel during recovery from illness and injury especially when related to or resulting from deployment.

Changes in the quality of post deployment relationships were also related to mental health symptoms. As might be expected, personnel who indicated that their family relationship had worsened following return from deployment were more likely to experience depression and PTSD symptoms than those who said the relationship was unchanged. In contrast, an unexpected finding was that personnel who reported improvements in their relationships were also more likely to experience heightened depression and PTSD symptoms compared to those who had stable unchanging relationships. It may be that servicemembers simply need time to readjust to family relationships after they have returned and suggests that any change, positive or negative, may shake a returning Service member's overall stability. Supporting family members should be aware of and sensitive to any changes to the relationship and home life to which these Service members are returning, even those that are seemingly innocuous and that familiar settings and ways of interacting may help them cope most effectively. In view of these findings there is a need to understand better how these changes in relationships relate to recovery from symptoms. Perhaps even with a diagnosis, those with supportive relationships have fewer, or perhaps more constrained symptoms, making intervention easier and of shorter duration.

These findings must be viewed in light of several study limitations. First our data are only from service members, not from spouses or significant others. Family dynamics may be viewed differently from the partners' perspective. Second, our data do not allow us to tell if symptom severity is influenced by family functioning or whether problems were pre-existing. A lack of information on predeployment family functioning prevents us from examining change in family adjustment over time. Third, no data were collected with respect to the experience of nonmilitary stressors and how those might relate to family functioning. Fourth, our data are cross-sectional so perceptions of changes in relationships are retrospective and may be influenced by accuracy of recall and factors associated with deployments such as the nature of family communication while away and the intensity and danger of combat experiences. Finally, the study's findings are based on self-reported data and are only as valid as participants were truthful. Even though participants were given assurances that their information would be kept private and confidential to the extent they were concerned about possible stigma, they may have underreported undesirable behaviors..

Despite these limitations, the study has many strengths. These include that (a) data come from a population-based study in which participants were selected using probability sampling methods, (b) the study

fielded a large number of respondents and the sample was stratified to ensure representation across the population of the four DoD services; (c) the study had a relatively high response rate for a military population (71%) which lowers the potential for bias in the estimates; (d) the study made use of sampling weights to correct for the clustered selection at military bases and to make nonresponse adjustments; and (e) field procedures assured anonymity of the survey responses to encourage honest reporting. ,

Findings from our analyses reinforce the importance of providing effective programs for military personnel and their families to help them meet the challenges of military service, especially during war time. It is critical to include family members in educational and training programs during their loved one's deployment to help inform them of potential issues like PTSD, depression, and substance use that may present themselves when service members returns from deployment. This could help facilitate greater family resilience if family members know what to anticipate and how to address potential issues if they arise.

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Table 1. Estimated Sociodemographic Characteristics of Married or Living as Married Active Duty Military Personnel .

Characteristic	N	Weighted %^a
Gender		
Male	11,438	87.4
Female	3,642	12.6
Age		
17-20	710	6.2
21-25	3,751	26.2
26-34	5,238	34.8
35 or older	5,381	32.9
Race/Ethnicity		
White—non-Hispanic	9,202	64.6
African American—non-Hispanic	2,370	16.7
Hispanic	2,066	10.2
Other	1,442	8.5
Children Living in Home		
Yes	9,240	59.4
No	5,761	40.6
Pay Grade		

E1-E3	1,921	11.0
E4-E6	7,159	53.3
E7-E9	2,368	14.2
W1-W5	484	1.9
O1-O3	1,591	10.0
O4-O10	1,557	9.6
Education		
High school or less	3,561	25.7
Some college	7,126	56.7
College degree or more	4,393	27.6
Service		
Army	3,491	39.5
Navy	4,156	23.7
Marine Corps	2,942	11.3
Air Force	4,491	25.5

^aPercentages may not sum to 100% due to rounding.

Table 2. Prevalence rates or mean values for risk and protective factors and/ for outcome variables.

<u>Risk and Protective Factors</u>	N	Weighted %^a	Mean (Std Dev)
Combat Exposure			
Not deployed	3,362	22.5	-
Deployed-none	3,682	24.5	-
Deployed-moderate	3,766	25.9	-
Deployed-high	3,005	27.2	-
Injury or Illness, past year			
Yes	6,007	39.9	-
No	9,073	61.2	-
Deployment-related Injury			
Yes	11,756	73.8	-
No	3,324	26.2	-
Post-deployment relationship status			
Relationship unchanged	11,214	75.5	-
Relationship worsened	1,373	9.6	-
Relationship improved	1,952	14.9	-
Relationship ended post-deployment			

Yes	834	6.3	-
No	13,705	93.7	-
Depression			
Yes	3,744	26.5	-
No	10,893	73.5	-
PTSD			
Yes	1,221	9.3	-
No	13,268	90.7	-
Harmful drinking			
Yes	608	6.0	-
No	10,974	94.0	-
<u>Outcomes</u>			
Presence of family-work conflict	-	-	3.12 (4.61)
Presence of family problems	-	-	3.81 (2.49)
Presence of work-family conflict	-	-	2.18 (5.84)

^aPercentages may not sum to 100% due to rounding.

Table 3. Logistic Regression Models Predicting Depression, PTSD and Harmful Drinking.

Independent Variables	Depression	PTSD	Harmful Drinking
Gender			
Male	1.00	1.00	1.00
Female	1.62 (1.39-1.89)*	1.36 (1.12-1.67)*	0.47 (0.26-0.86)*
Age			
17-20	0.86 (0.64-1.15)	1.18 (0.77-1.80)	1.83 (0.97-3.43)
21-25	0.83 (0.70-0.99)*	0.97 (0.71-1.33)	1.93 (1.31-2.83)*
26-34	0.73 (0.64-0.83)*	0.94 (0.73-1.22)	1.15 (0.78-1.67)
35 or older	1.00	1.00	1.00
Race/Ethnicity			
White–non-Hispanic	1.18 (0.98-1.43)	1.34 (1.02-1.76)*	1.65 (1.08-2.53)*
African American–non-Hispanic	1.00	1.00	1.00
Hispanic	1.04 (0.79-1.37)	1.16 (0.83-1.64)	1.62 (1.05-2.50)*
Other	1.17 (0.92-1.49)	1.70 (1.19-2.42)*	1.55 (0.92-2.64)
Family Status			
No children in home	1.00	1.00	1.00
1 or more children in home	0.86 (0.78-0.95)*	1.09 (0.89-1.34)	0.78 (0.63-0.98)*
Pay Grade			

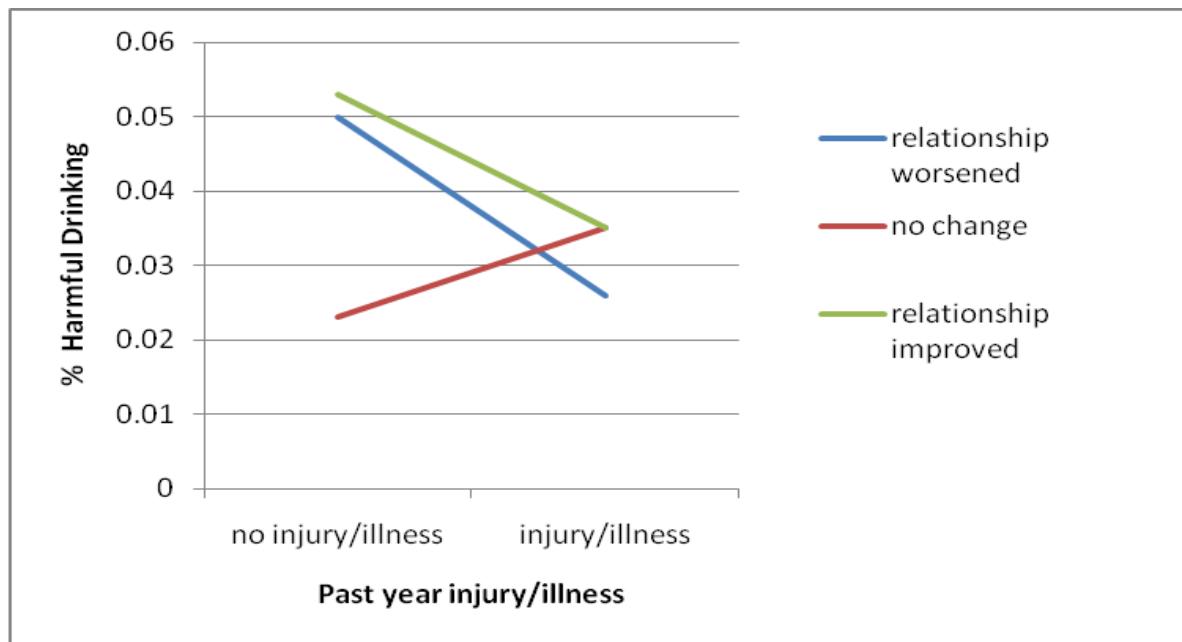
E1-E3	2.09 (1.52-2.87)*	5.63 (2.25- 14.11)*	3.10 (1.57-6.12)*
E4-E6	1.58 (1.21-2.06)*	3.36 (1.37-8.20)*	1.55 (0.85-2.80)
E7-E9	1.14 (0.86-1.52)	2.09 (0.93-4.70)	1.47 (0.82-2.64)
W1-W5	0.80 (0.57-1.11)	0.67 (0.09-5.29)	0.98 (0.61-1.59)
O1-O3	1.01 (0.77-1.32)	1.69 (0.70-4.10)	0.95 (0.47-1.93)
O4-O10	1.00	1.00	1.00
Education			
High school or less	1.30 (1.01-1.68)*	1.24 (0.89-1.72)	1.38 (0.90-2.12)
Some college	1.19 (0.97-1.46)	1.06 (0.77-1.46)	0.95 (0.59-1.54)
College degree or more	1.00	1.00	1.00
Service			
Army	1.36 (1.22-1.52)*	1.24 (0.96-1.59)	1.48 (0.96-2.28)
Navy	1.31 (1.19-1.45)*	1.29 (0.98-1.70)	1.82 (1.22-2.72)*
Marine Corps	1.33 (1.12-1.59)*	1.56 (1.12-2.17)*	1.57 (1.01-2.46)*
Air Force	1.00	1.00	1.00
Combat Exposure			
Not deployed	1.18 (0.97-1.44)	1.47 (1.07-2.03)*	0.85 (0.61-1.17)
Deployed-none	1.00	1.00	1.00
Deployed-moderate	0.91 (0.79-1.05)	0.79 (0.59-1.06)	0.74 (0.56-0.99)*

Deployed-high	0.86 (0.72-1.04)	1.69 (1.30-2.18)*	1.36 (0.92-2.01)
Injury/Illness, past 12 months			
Yes	1.69 (1.46-1.95)*	1.72 (1.36-2.17)*	1.09 (0.78-1.52)
No	1.00	1.00	1.00
Deployment-related Injury			
Yes	1.28 (1.02-1.59)*	1.74 (1.40-2.16)*	1.28 (0.91-1.79)
No	1.00	1.00	1.00
Post-deployment relationship status			
Relationship unchanged	1.00	1.00	1.00
Relationship worsened	1.29 (1.04-1.60)*	1.54 (1.12-2.12)*	1.27 (0.88-1.84)
Relationship improved	2.01 (1.76-2.29)*	2.63 (2.12-3.26)*	1.29 (0.93-1.77)
Post-deployment relationship termination			
Relationship ended	1.00	1.00	1.00
Relationship did not end	0.78 (0.66-0.93)*	0.70 (0.55-0.91)*	0.49 (0.35-0.68)*
Presence of family-work conflict			
Yes	0.72 (0.65-0.80)*	0.81 (0.73-0.89)*	0.78 (0.67-0.93)*

No	1.00	1.00	1.00
Presence of family problems			
Yes	0.37 (0.32-0.42)*	0.53 (0.44-0.63)*	0.46 (0.36-0.58)*
No	1.00	1.00	1.00
Presence of work-family conflict			
Yes	0.43 (0.39-0.47)*	0.41 (0.36-0.46)*	0.75 (0.63-0.88)*
No	1.00	1.00	1.00

*Odds ratio is significantly different from the reference group.

Figure 1. Interaction of relationship change and past year injury/illness on harmful drinking.



Appendix B

Power Point Presentation

Understanding Resilience in Wounded Warriors and Their Families

Jim Spira, PhD, MPH. VA-NCPTSD

Amy McLean, PhD, RTI International

Janice Brown, PhD, RTI International

Award Number:

W81XWH-09-1-0527

Award Date:

August 1, 2009 – Feb 28, 2011

Award Amount:

COR:

Mr. Ayi Ayayi

Project Officer:

Dr. Kimberly Del Carmen

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Michigan State University/University of Michigan
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Michigan National Guard

Study Background/Rationale

- Little understanding of psychological and physical wounds of war on family functioning
 - physical vs psychological wounds
 - service members vs spouses
 - single dimension vs polytrauma (physical + psychological)
- Few discussions of sensitizing and protective factors in service members and their spouses following wounds acquired during deployment on family functioning
 - dyadic adjustment, parental stress, family chaos

Research Questions

Sensitizing Factors:

- What are the effects of combat injury on family functioning?
 - 1) Psychological Injury: PTSD, Depression, Hazardous Alcohol Use
 - 2) Physical Wounds: TBI, Self-report physical Injury
 - 3) Poly-trauma: both psychological and physical injury
- We predicted that polytrauma would worsen family distress

Protective Factors:

- 4) Does family functioning mediate the effects of injury on QoL
- 5) Do demographic variables mediate the effects of injury on family functioning? (Age, sex, years married, children, race, etc)

Design and Methodology

- Anonymous, confidential, voluntary surveys obtained at MI-AR-NG Yellow Ribbon Reintegration event held 45-90 days post-deployment
- 2 waves of data collection in Michigan National Guard
 - Study 1: MSU 10/07-9/08
 - Study 2: MSU/UM 2/09-4/10
- Survey response rate (*Soldier/Spouse*):
 - Study 1:
 - 40/36%
 - \$10 incentive
 - 25-30 minutes
 - Study 2:
 - 78/80%
 - \$25 incentive
 - 45-60 minutes

Study Measures

Psychological Injury

- PTSD symptoms (PCL-M, Short Screening Scale for DSM-IV PTSD, PCL-C)
- Depressive symptoms (BDI-II, PHQ-9)
- Hazardous alcohol use (AUDIT: Alcohol Use Disorders Identification Test,)

Physical Injury

- TBI symptoms (PDHA 2008)
- Self-report (Were you wounded or injured during recent deployment?)

Family Functioning

- Relationship Distress (DAS-R: Revised Dyadic Adjustment Scale)
- Parenting Stress (PSS: Parental Stress Scale)
- Family Chaos (Confusion, Hubbub, and Order Scale)

Quality of Life

- Functional Status (Short Form, SF-12)

Demographic Breakout of Participants (N=1,482)

Service Members

Age : ≤30=449 (48%);
 >30=474 (52%)

Gender:

- M=796 (88%);
- F=111 (12%)

Marital Status

- Married = 510 (56%)
- Single = 212 (23%)
- Engaged = 73 (8%)
- Separated or Divorced = 82 (9%)
- Cohabitating or Other = 35 (4%)

Ethnicity

- African American = 64 (8%)
- Caucasian = 711 (83%)
- Hispanic = 26 (3%)
- Native American = 15 (2%)
- Asian American = 13 (2%)
- Multi-Ethnic or Other = 23 (3%)

Spouses/ Significant Others

Age

- ≤30 = 258 (47%)
- >30 = 296 (53%)

Gender

- Male = 34 (6%)
- Female = 519 (94%)

Marital Status

- Married = 430 (79.8%)
- Single = 24 (4%)
- Engaged = 56 (10%)
- Separated or Divorced = 8 (1.2%)
- Cohabitating or Other = 29 (5%)

Ethnicity

- African American = 34 (7%)
- Caucasian = 425 (83%)
- Hispanic = 19 (4%)
- Native American = 15 (2%)
- Asian American = 13 (2%)
- Multi-Ethnic or Other = 23 (3%)

Descriptive Data

Study 1

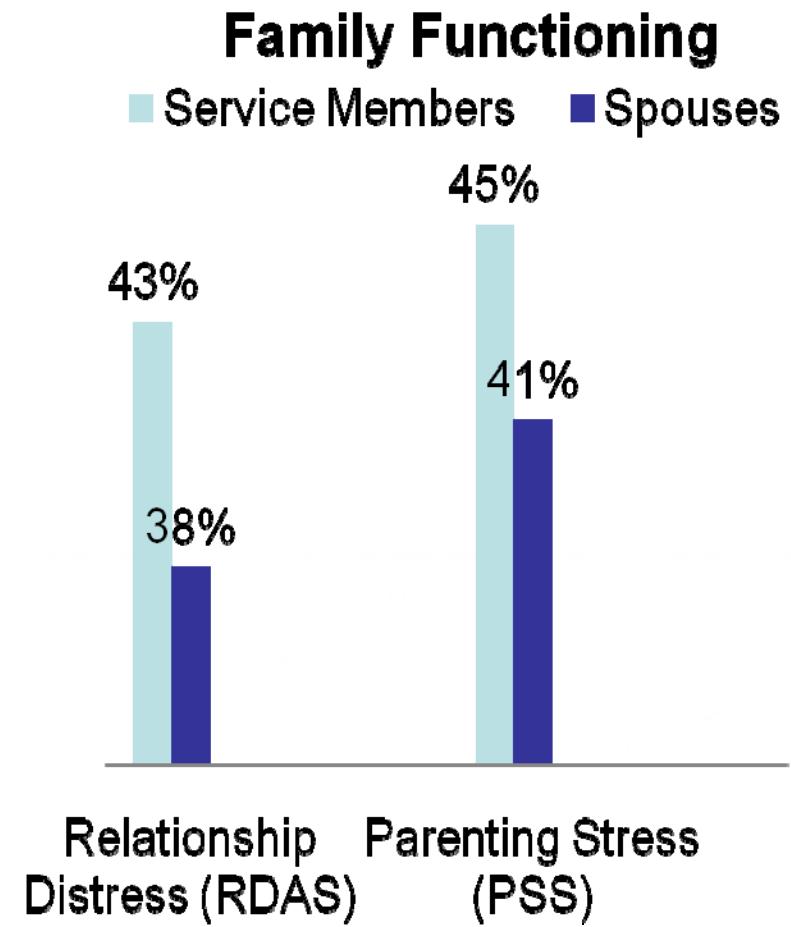
- 212 Spouses/ Sig. Others
- 332 Service Members
- 200 Paired Couples

Study 2

- 315 Spouses/Sig. Others
- 585 Service Members (24 dual-career military)
- 325 Paired Couples

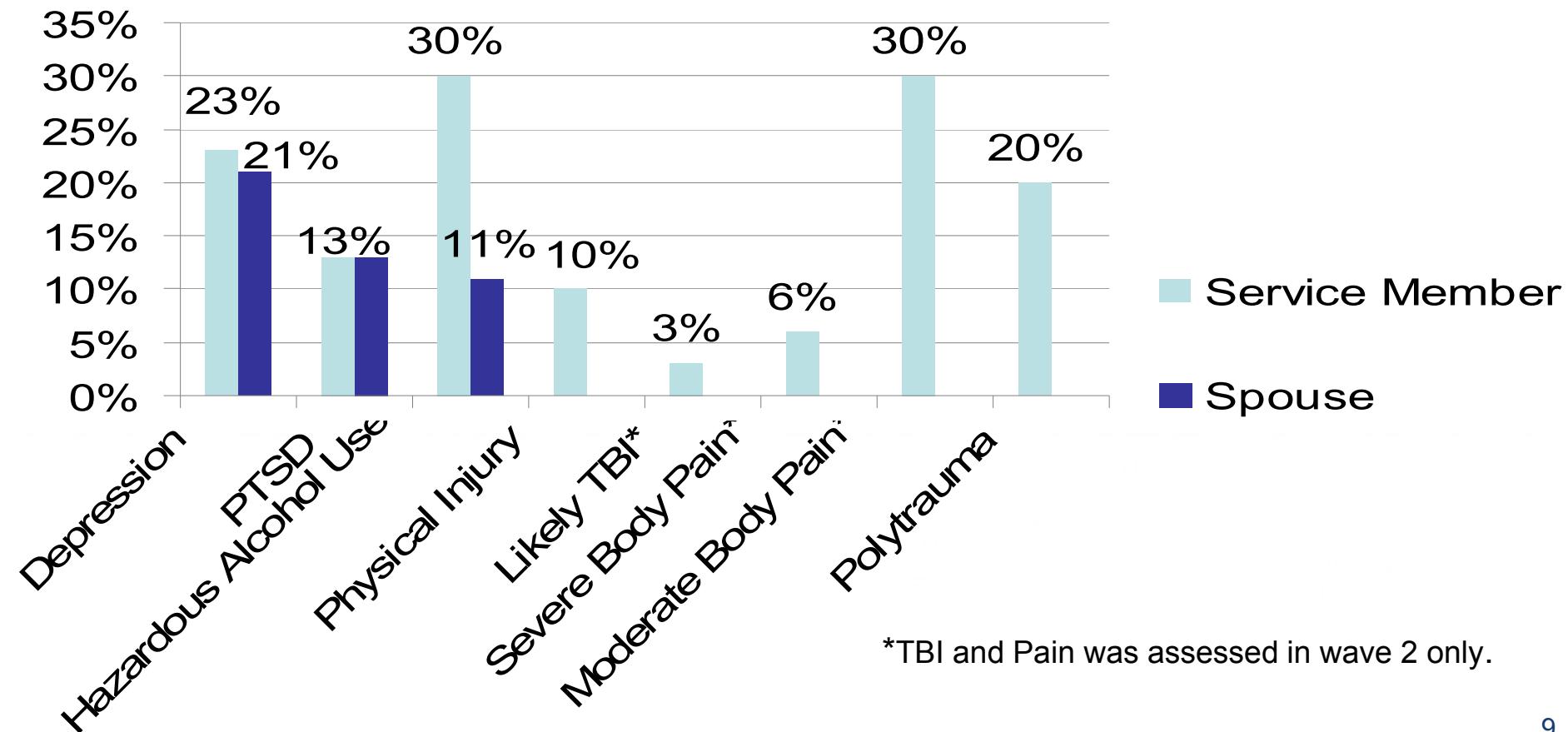
Parents

- 382 (70%) Spouses/ Sig. Others
- 515 (60%) Service Members



Preliminary Results

Percent of Participants with Injury



Service Member's Issue	RDAS (df) correlation	PSS (df) correlation	CHAOS (df) correlation
Depression (PHQ-9)	SM: (313) -.319** SP: (310) -.185**	SM: (202) .273** SP: (203) .190**	SM: (208) -.308** SP: (217) -.188**
PTSD (PCL-M)	SM: (490) -.199** SP: (492) -.092*	SM: (346) .128* SP: (345) .051	SM: (198) -.215** SP: (208) -.080
Alcohol Use (AUDIT)	SM: (504) -.219** SP: (505) .014	SM: (358) .130* SP: (356) -.108*	SM: (205) -.181** SP: (215) -.038
Physical Injury	SM: (487) -.058 SP: (486) -.004	SM: (348) .102 SP: (343) .029	SM: (197) -.092 SP: (204) -.144*
TBI	SM: (316) -.185** SP: (313) -.071	SM: (204) .088 SP: (205) .023	SM: (211) -.052 SP: (220) .006
Body Pain	SM: (311) -.112* SP: (308) -.043	SM: (200) .133 SP: (201) .124	SM: (206) -.151* SP: (215) -.111
Polytrauma	SM: (472) -.144** SP: (492) -.071	SM: (336) .147** SP: (334) .053	SM: (490) -.100 SP: (492) -.088

<i>Multilevel Modeling Results</i> <i>*p<.05</i> <i>**p<.01</i>	NO Injured		YES Injured		Injury Main Effect	Role Main Effect	Inter- action
	SM	SP	SM	SP			
DAS	49.97	49.41	48.17	48.54	1.31	0.02	0.80
PSS	35.87	35.91	39.61	35.72	3.09	4.87*	5.14*
AUDIT	5.52	3.42	7.03	3.17	1.47	60.46**	5.44*
Zdep	-0.11	-0.02	0.49	0.19	18.18**	1.91	5.77*
PCL-Smp1	29.71	-	46.00	-	36.82**	-	
PCL-Smp2	28.58	27.71	38.40	31.60	18.24**	6.60*	5.77*

Multilevel Modeling: Combined Cohorts; Combined Factors

Injury vs No Injury for Service Members and Spouses:

- **Psychological Injury** had a strong effect on all measures of family functioning for BOTH SM and SP
- **Physical Injury** had an effect on psychological mood for SM BUT NOT SPOUSES
- **Physical Injury** had NO EFFECT on 2/3 family functioning in BOTH SM and SP (small effect for SM on PSS, not SP)
- **Polytrauma** had NO EFFECT on any family functioning measure for either SM or SP
- **Suspected mTBI** had AN EFFECT on DAS for BOTH SM and SP, and PSS for SM only

Conclusion

In this population of recently returned combat deployed MI-NG:

- **Psychological Injury** (Depression, PTSD, ETOH) does negatively affect family functioning for both SM & SP
- **mTBI** does negatively affect family functioning for both SM & SP
- **Physical Injury** does not negatively influence family functioning
- **Polytrauma** does not negatively influence family functioning
- Thus:
 - invisible wounds (psych/TBI) negatively affect family functioning
 - the presence of a visible wound buffers against family distress¹³

Final Product

- Submitting findings to a journal (this summer)
- Using this preliminary data to seek funding for a longitudinal analysis of families of wounded warriors
 - Follow service members and their families longitudinally: (pre-, immediate post-, 1-year post-deployment)
 - Improve understanding of *Sensitizing Factors*:
 - Changes in psychological factors and family functioning over deployment and due to injury
 - Improve Understanding of *Protective Factors*:
 - Understand the effects of pre-existing *positive family functioning* on mood for wounded warriors;
 - demographics (race, age, length of marriage, # children, etc.)

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Contact Information:

**Jim Spira, PhD, MPH, ABPP, Director
National Center for PTSD, Pacific Islands Div
United States Department of Veteran Affairs
3375 Koapaka Street, I-560; Honolulu, HI 96820**
James.Spira@VA.Gov **(808) 954-6390**